

APPENDIX WR1: SURFACE WATER MANAGEMENT PLAN

Cultivate Hopkins Comprehensive Plan

BOLTON & MENK8/22/18

Water Resources Management Plan

Summary

The City of Hopkins (City) has developed this Water Resources Management Plan (WRMP) to meet regulatory requirements, and to plan for future alterations in the existing drainage system due to redevelopment activities. The City is completely developed with a mix of commercial, industrial, residential and open space uses. Redevelopment activities within the City are also occurring as the population of the surrounding area continues to grow.

The City has no lakes and only several public water wetlands that are identified on the Department of Natural Resources Protected Waters and Wetlands map. Portions of Minnehaha Creek meander through the City and it is the headwaters for Nine Mile Creek. The City is within the Minnehaha Creek Watershed District (MCWD) and the Nine Mile Creek Watershed District (NMCWD). The MCWD updated its Comprehensive Water Resources Management Plan in 2018, and the NMCWD updated its Water Management Plan in 2017. Minnesota Rules Part 8410.0160, Subpart 1 states:

- Each local water plan must, at a minimum, meet the requirements for local water management plans in Minnesota Statutes, Section 103B.235, except as provided by the watershed management organization plan under Part 8410.0105, Subpart 9.

The City of Hopkins will utilize this plan, the accompanying rules, and existing and new ordinances as the basis for managing wetlands, surface, storm, flood, and groundwater within the municipal boundary. The City will continue to work to ensure that its' goals and policies and development standards are consistent with both Watershed Districts as the plans and rules are revised.

Water Resource Management Related Agreements

The City of Hopkins will be assuming regulatory authority for land use development while recognizing the role of other local, state, and federal entities. Several entities will have administrative responsibilities within the planning area. For a local water management effort to be successful, each entity's commitment and role must be clearly understood.

The agencies currently having some level of administration responsibility include the City, MCWD, NMCWD, Minnesota Department of Natural Resources (MNDNR), Minnesota Pollution Control Agency (MPCA), the U.S. Army Corps of Engineers (USACE), the Minnesota Board of Water and Soil Resources (BWSR), and Hennepin County. It has been recognized that regulatory agencies can achieve common goals by joining together to combine already scarce financial and regulatory resources.

The City of Hopkins is required to meet the conditions of its National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit and to implement its' Storm Water Pollution Prevention Program (SWPPP). The City continues to actively engage the MPCA and others to keep its permit and implementation up to date regarding new technology and regulations.

Amendment Process

For the Plan to remain a dynamic, effective document, a system must be identified and available to update information and implement new ideas, methods, standards, management practices, and any other changes, which may affect the intent and/or results of the Plan. This Plan shall remain in effect, unless an amended Plan is adopted, not to exceed 10 years from the date of initial adoption. Any person or persons either residing or having business within the City can request amendment proposals at any time. The City itself may amend this Plan at any time if changes are required or if issues or opportunities arise that are not currently addressed. All amendments shall be in accordance with Minnesota Rules 8410.0160 Subp. 4 and Minnesota Statutes 103b.235 Subd. 5.

Physical Environment and Land Use

Land Use

Downtown Hopkins

The City of Hopkins lies in southeast Hennepin County. The City contains 2,760 acres of land and water resources within its corporate boundaries, and is bounded by the cities of Minnetonka, Edina, and St. Louis Park. The City is essentially fully developed.

Existing Land Use

Most of the existing land is residential, including both single family dwellings and multi-family units. There is a significant industrial area along the railroad tracks. Commercial development exists primarily along the major roadways, including Mainstreet, County Road 3, Blake Road, Shady Oak Road and some parts along Highway 7. In addition, there are several open areas which are occupied by parks, golf courses and wetlands. **Figure SW-08** shows the existing land use in the City of Hopkins.

Future Land Use

The City of Hopkins is fully developed. The future land use as defined in the 2018 Comprehensive Plan is shown within the land use elements of the plan. The future land use changes will be a result of redevelopment activities. Future redevelopment activities should not have a significant impact on regional storm water conveyance systems provided existing development runoff rates are adhered to through the development of stormwater management improvements with the development.

Additional Land Use Control

Shoreland

The City of Hopkins has not adopted a shoreland ordinance. At this time, the Minnesota Department of Natural Resources (MNDNR) does not require a shoreland ordinance, and we do not see the need to implement one in the near future.

Floodplain

The City participates in the National Flood Insurance Program (NFIP). The City administers a floodplain ordinance based upon the effective Flood Insurance Study (FIS) for the City of Hopkins (dated September 2, 2004). There are two flooding sources (Minnehaha Creek and Nine Mile Creek) shown in the FIS.

Flooding in the City results from both summer rainstorms and spring snowmelt runoff. Nine Mile Creek's

headwaters begin in Hopkins, just north of Excelsior Boulevard. The land use adjacent to Nine Mile Creek in Hopkins is predominantly urban in nature. Natural drainage in the community is not well defined, and the City has constructed an extensive storm sewer system as a result. Nine Mile Creek is very responsive to short-duration, high-intensity rainstorms which rapidly flow from the highly impervious area through the constructed storm sewer system. Existing land cover from available LiDAR data is shown in **Figure SW-05**.

Minnehaha Creek crosses through the City along the far northern border and in the northeast corner. In the spring and early summer of 2014, the MCWD experienced a record amount of rainfall resulting in various flooding throughout the watershed. The district had a report prepared that summarized the flooding associated with this event. The Minnehaha Creek corridor through Hopkins did not experience any substantial flooding issues that were reported in the 2014 flood report.

Flood Insurance Rate Map Numbers 27053C033F, 27053C0341F and 27053C0342F show the base flood elevations for the floodway areas in zone AE for Minnehaha Creek and Nine Mile Creek within the City limits. Zone AE is an area where the base flood has been determined. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% (100-year) annual chance flood can be carried without substantial increases in flood heights. A majority of the City is in zone X, which is an area determined to be outside the 0.2 percent annual chance floodplain.

The City of Hopkins, MCWD and the NMCWD currently regulate development in the floodplains along Minnehaha Creek and Nine Mile Creek.

Permitting

The City of Hopkins reviews, approves and permits storm water management plans for land disturbing activities on projects that meet the City's ordinance requirements.

MCWD and the NMCWD serve in an advisory role to the City on development and redevelopment projects. These agencies also hold permitting authority with their unique stormwater management requirements. District staff reviews development proposals and make recommendations consistent with their requirements for water quality, volume control, flooding, rate control, wetland protection, waterbody crossings and structures, streambank stabilization and erosion control. Watershed permits are required for projects that meet the district's rule criteria.

Hydrologic Setting

Regional Climate

The climatology of Minnesota is described in the United States Geological Survey (USGS) Water-Supply Paper 2375 as follows:

Minnesota is affected by a variety of air masses. In winter, the weather is dominated by cold, dry, and polar continental air masses from northwestern Canada. In summer, the weather is dominated by dry, tropical continental air masses from the desert southwest or by warm, moist, tropical maritime air masses from the Gulf of Mexico. In spring and fall, the weather is transitional and is affected by alternating intrusions from these three air masses.

Almost 45 percent (about 12 inches) of Minnesota’s annual precipitation is received from June through August, When moisture from the Gulf of Mexico is most available. Only 8 percent of the annual precipitation is received from December through February.

Cyclonic and convective storms are the two major types of storms that bring moisture into Minnesota. Cyclonic storms are large-scale, low-pressure systems associated with frontal systems that approach the State from the northwest or southwest. Cyclonic storms that approach from the northwest are common in winter and produce small quantities of precipitation. Cyclonic storms that approach from the southwest occur in the fall, winter, and spring and can bring substantial quantities of rain or snow by drawing moisture northward from the Gulf of Mexico. Cyclonic storms in combination with unstable conditions can produce severe weather and excessive precipitation.

In late spring and summer, thunderstorms are common. These small-scale convective storms typically form because of the presence of unstable, warm, tropical air near the surface and colder air above.

Floods in Minnesota are of two forms, large-scale floods in late winter and early spring, and small-scale flash floods in late spring and summer. Large-scale floods generally result from a combination of deep, late winter snowpack, frozen soil that prevents infiltration, rapid snowmelt due to an intrusion of tropical air, and widespread precipitation caused by cyclonic storms that approach the State from the southwest. Flash floods result from powerful, slow-moving thunderstorms.

Average annual values for various weather data components for the Hopkins area are listed below in Table 1.1: Average Annual Weather Data.

Table WR-1: Average Annual Weather Data	
Weather Data	Value
Annual Normal Temperature	43°
Annual Normal Precipitation	29 inches
Annual Runoff Depth	4.7 inches
Storm Duration	6 hours
Storm Intensity	1.4 inches per hour
Time Between Storm Midpoints	89 hours

Additional description of the climate of the area is provided in the MCWD Water Resources Management Plan.

Major Watersheds

A northern and eastern portion of the City drains to Minnehaha Creek, while the southern portion of the City drains to Nine Mile Creek, both through natural drainage channels and a constructed storm sewer system.

The City of Hopkins was divided into four major watersheds called the Northern, Eastern, Central and Southern districts. These are discussed in more detail later in this report.

The Northern District is defined as the area in the City which drains to Minnehaha Creek upstream of Highway 7. The Eastern District is defined as the area which drains into Minnehaha Creek downstream of Highway 7. The Central District naturally drains to Nine Mile Creek upstream of the Chicago Northwestern Transportation (C.N.W.T.) railroad tracks. The Southern District drains to Nine Mile Creek downstream of the C.N.W.T. railroad tracks.

Surface Water Resources

Wetlands

The National Wetland Inventory Map shows the location of wetlands within the City of Hopkins (see **Figures SW-01 and SW-08**). In addition to these basins, there are several storm water detention basins within the City limits which provide some of the benefits of a natural wetland basin.

There are four Minnesota Department of Natural Resources (MNDNR) Protected Waters and Wetlands (MNDNR Nos. 27-717W, 27-719P, 27-777P, and 27-779W) within the City. Part of MN/DNR No. 27-084P is located in the northern section of the City. This protected water is also located in the cities of St. Louis Park and Minnetonka.

Creeks

Minnehaha Creek

Minnehaha Creek is a direct tributary to the Mississippi River. Lake Minnetonka is the headwater for the creek. It is a MNDNR watercourse and flows east at the north end of Hopkins and southeast on the east side of the City.

Nine Mile Creek

The headwater of the north fork of Nine Mile Creek is at the southern edge of Excelsior Boulevard in the southwest portion of Hopkins. Nine Mile Creek flows southeast to the Minnesota River, and is a MNDNR protected watercourse.

Ditches

Much of the surface water is routed through an existing storm sewer system within the City of Hopkins. This includes a system of storm sewer pipes, ponds, ditches, and culverts.

General Drainage Patterns

The City of Hopkins lies within the MCWD and the NMCWD. The northern and eastern portions of the City drain to Minnehaha Creek, and the southern and central portions of the City drain to Nine Mile Creek. The City has been delineated into about 60 subwatersheds. The City of Hopkins has numerous points of discharge from and to the cities of Minnetonka, Edina, and St. Louis Park.

The City of Hopkins contains several land-locked areas. A land-locked area is one which will not drain naturally on the ground surface. An outlet for each of these areas should be considered to decrease the flooding potential.

Modeling & Studies

Hydrologic Modeling

An Autodesk™ Storm and Sanitary Analysis (SSA) model has been created for specific studies within the City of Hopkins, but there has not been a hydrologic model created for the entire City. Areas modeled previously and the existing storm sewer system are depicted in **Figure SW-02**.

The following paragraphs discuss areas within the City. For ease of organization in this report, the City has been broken into four drainage districts based on watershed drainage pattern. The boundaries of each district are depicted in **Figure SW-02** and generally bounded as:

1. Central District – area north of Excelsior Blvd, south of Hwy 7, and west of 5th Ave N
2. Northern District – Area north of Highway 7
3. Eastern District – All area east of Highway 169, but also including the Park Ridge and Hobby Acres neighborhoods
4. Southern District – Area south of Excelsior Blvd, west of Highway 169

Water Resource Studies

The following table is a list of important studies that have been completed in the City of Hopkins. For additional information, please see the listed studies and reports in Table 1.2: Summary of Water Resources Studies Feasibility.

Table WR-2 - Summary of Water Resources Studies, 2007 - 2018			
Study Name	Study Type	Prepared By	Year
2008 Minnetonka Mills Road Improvements	Feasibility Report	Bolton & Menk	2007
2009 Street & Utility Improvements (Park Ridge Neighborhood)	Feasibility Report	Bolton & Menk	2008
2011 Street & Utility Improvements (14 th Ave N, 15 th Ave N, 16 th Ave N)	Feasibility Study	Bolton & Menk	2010
2012 Street & Utility Improvements (Minnetonka Mills Rd, W of 5 th Ave)	Feasibility Report	Bolton & Menk	2011
2013 Street & Utility Improvements (South Presidents Neighborhood)	Feasibility Report	Bolton & Menk	2012
13 th Ave N Drainage Study	Letter Report & Figures	Bolton & Menk	2014
2016 Street & Utility Improvements (18 th – 21 st Ave N, 2 nd – 4 th St N)	Feasibility Report	Bolton & Menk	2015
2017 Street & Utility Improvements (Park Valley Neighborhood)	Feasibility Report	Bolton & Menk	2016
8 th Avenue Artery Improvements	Volume Baking Agreement & Design	Bolton & Menk, NMCWD, City of Hopkins	2017
2018 Street & Utility Improvements (Lake St NE, Texas Ave, Cambridge, Oxford, Division)	Feasibility Report	Bolton & Menk	2017

In the vast majority of studies noted above, the City evaluated the feasibility and cost effectiveness of drainage improvements, and implemented them through its annual pavement management projects. The

13th Ave N Drainage Study was commissioned in response to localized flooding following a severe rainfall event, however. At some point within the next decade, improvements to 13th Ave N may be reconsidered at the time of street and utility reconstruction.

13th Ave N Drainage Study

The 13th Ave N Drainage Study was completed by Bolton & Menk in early 2014 following heavy rain events in July, 2013 caused flash flooding along 13th Avenue N, south of 3rd Street N. The property at 238 13th Avenue N experienced some storm water inflows to their house. The land-locked low area in the backyard of this home also experienced unusually high water levels. The study analyzed the storm water conveyance system through the bulk of the Central drainage district.

Analysis of the existing system concluded there would be surcharging of the system along 3rd St N during events as small as a 2 year storm. The study analyzed three alternatives with varying benefits and impacts. Essentially, the City’s storm sewer system upstream of Maetzold Field is constrained (during a 10 year event) along 15th Ave N and along 13th Ave N to varying degrees. Improvements were considered to alleviate the excess flow in the storm sewer, which during surcharging will flow above ground along roadways. However, this would shift water to Maetzold Field.

Ultimately, some upsizing of storm sewer along 3rd St N was implemented in 2014. Some improvements were limited due to sanitary sewer and funding constraints. It is recommended this drainage study be revisited when 13th Ave N near 3rd Street is scoped for improvements in conjunction with the City’s Pavement Management Plan.

8th Avenue Artery Volume Banking

In 2017 the City and NMCWD established a volume bank for stormwater management credits. These credits are intended for use in support of City projects and for sale to developers along or near the 8th Avenue corridor where those developers cannot easily achieve compliance with stormwater management requirements. The City maintains a spreadsheet which tracks volume credits created and expended.

Design Criteria

Design Storm

In 2013, the National Weather Service (NWS) released NOAA Atlas 14, Volume 8, which updated the 1961 TP-40 precipitation frequency estimates for Midwestern states. The 24-hour duration, TP-40 Type II rainfall distribution was previously used for overall subwatershed planning within the City of Hopkins. For future development purposes the Atlas 14 distribution MSE 3 rainfall depths will be used for quantifying stormwater runoff.

The table below shows the difference between the TP-40 and Atlas 14 24-hour rainfall amounts in Hopkins. This criterion is consistent with the MCWD Water Resources Management Plan, the NMCWD 509 Plan, and guidance from the NRCS.

Table WR-3 Rainfall Depths for a 24-hr Event

Precipitation Data Source	1-Year (inches)	2-Year (inches)	5-Year (inches)	10-Year (inches)	50-Year (inches)	100-Year (inches)
TP-40 Rainfall	2.3	2.7	3.5	4.1	5.3	5.9
Atlas 14 Rainfall Rainfall	2.50	2.87	3.59	4.29	6.38	7.46

Projects within the MCWD require stormwater rate control for the 1, 10 and 100-year storm events and volume control for 1 inch of runoff from a sites impervious surface. Projects within the NMCWD require stormwater rate control for the 2, 10 and 100-year storm events and volume control for 1.1 inches of runoff from regulated impervious surfaces.

Rain Gages

The City of Hopkins has a rain gage on the public works building. There are other rain gages in the surrounding area that can be used to obtain rainfall data, such as the web based Community Collaborative Rain, Hail & Snow Network (CoCoRaHS); the Twin Cities National Weather Service Station in Chanhassen. The National Oceanic and Atmospheric Administration (NOAA) also has stations in the cities of Crystal, Golden Valley, Robbinsdale and Plymouth.

Storm Sewer Collection System

The minimum design storm for the future local collection system evaluation and design will be a 10-year return period event. Design of local storm sewer systems will generally be designed using the Rational Formula.

The choice of a design storm is largely an economic rather than a technical decision. The City should deliberately consider the level of service desired when it chooses the recurrence interval used in any construction project.

Other City Requirements

Any new construction of development has the potential of increasing runoff rates and volumes. The development or redevelopment of land must include facilities to provide water quality treatment and control runoff at existing or reduced rates.

Variances from plan standards will be allowed if computations that demonstrate no adverse upstream or downstream effects will result from the proposed system can be provided to the City Engineer.

Establishment of Goals and Policies

The primary goal of the City’s Plan and associated Rules is to provide the framework for the management of all forms of surface water as development and redevelopment occurs within the City. This Plan provides clear guidance on how the City will manage surface water both in terms of quantity and quality. The goals and policies stated in this Plan are complimentary to the goals and policies stated in the CWRMP and VRWMP.

Resource education and increasing regulation of surface water at the State, County, and Federal levels necessitate that the City's surface water management goals evolve over time with increased awareness.

The goals and policies detailed in this Plan focus on future redevelopment as much as the existing infrastructure. The City only conducts plan reviews "as development occurs" as part of the preliminary plat submittal and approval process. This emphasis on future requirements ensures that future development augments the City's amenities rather than diminishes the complex environments that the City is located within.

Goal 1: Stormwater Management

The purpose of this goal is to control flooding and minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff, in accordance with the MCWD and the NMCWD. Traditional surface water management deals with just one component of the hydrologic cycle; surface runoff. Large amounts of energy are directed towards alleviating significant negative impacts of surface runoff and flooding for the cultural, water, and natural resources.

The primary management strategy is shifting from detention in both existing natural and constructed basins, to Low Impact Development (LID) techniques and Green Infrastructure Techniques that emphasize reduction of runoff volume and on-site runoff control via infiltration or small volume storage to mimic predevelopment hydrology for more frequent rainfall events. This trend will help remedy the negative impact of stormwater runoff on water quality and downstream flooding. With increased value placed on natural wetlands, the number and extent to which wetlands can be used for detention is already in decline. The approach to sound water quantity management relates directly to water quality, wetland management, erosion control, and land development strategies. By comprehensively managing the quantity and quality of surface water runoff, the other goals of this Plan are more efficiently achieved.

Subject: Surface Water Runoff (Rate and Volume) Management.

Purpose: Control post-development stormwater runoff.

Goal: Control flooding, protect human life, protect public and private property, mimic existing runoff conditions, minimize related public capital and maintenance expenditure necessary to control excessive volumes and rates of surface water runoff from entering streams and wetlands in the watershed, and maintain or improve the downstream conveyance system.

Surface Water Quantity Policies

Policy 1.1: Utilize LID site design and alternative landscape techniques where applicable, along with conventional constructed on-site detention ponds for large, infrequent rainfall events. Pre-developed peak flow rates for the 1-yr, 10-yr, and 100-yr, 24-hour, storm events cannot be exceeded by new development in MCWD. Pre-developed peak flow rates for the 2-yr, 10-yr, and 100-yr, 24-hour, storm events cannot be exceeded by new development in NMCWD. These design techniques will be relied upon to help mimic pre-development hydrology and to control downstream flooding.

The NOAA Atlas 14 rainfall depths using a NRCS MSE 3 distribution shall be used for calculating peak flow rates.

Policy 1.2: The City will encourage and enforce volume reduction standards throughout the City and

where site conditions are feasible. The City will strive to reduce or minimize impervious surface coverage where practical or feasible.

Policy 1.3: The City shall maintain and periodically inspect stormwater management facilities and structures to assure they function as originally designed according to the Storm Water Pollution Prevention Plan requirements.

Goal 2: Water Quality

The purpose of this goal is to achieve water quality standards in lakes, creeks, and wetlands consistent with the intended use and classification. Water quality is often directly related to the level of nutrients in the water body. While nutrients comprise only one category of substances that can affect water quality, nutrients, principally phosphorous, must be controlled to achieve the water quality goals of this Plan. Phosphorous is generally the limiting factor to plant growth. An increase in phosphorous will cause the plant species dominating the lakeshore, open water, or marsh to shift in favor those plants that can best take advantage of the increased supply of the nutrient.

Controlling nutrients through housekeeping practices are a way for City residents to make a difference. According to the Minneapolis Chain of Lakes Clean Water Partnership, many people do not realize that organic materials like leaves, grass clippings, fertilizers, pesticides, and pet waste can disrupt the fragile ecosystem of a lake or creek.

Subject: Water quality in lakes, rivers, creeks, and wetlands.

Purpose: To protect and enhance water quality.

Goal: Achieve water quality standards in lakes, creeks, and wetlands consistent with their intended use and established classification.

Water Quality Policies

Policy 2.1: Proposed developments must identify all reasonable steps taken to avoid water quality impacts. They must also mitigate unavoidable impacts with appropriate BMPs to prevent water quality in receiving waters from falling below established standards including TMDLs, and to meet City erosion control ordinance standards.

Policy 2.2: The City shall promote the reduction or minimization of hard surfaced areas, where applicable.

Policy 2.3: The City will balance protection of natural wetlands and utilization of constructed wetlands to protect the water quality of other water resources (i.e., wetlands, lakes, creeks) based on MnRAM wetland classification.

Policy 2.4: It essential that the condition of water bodies in the Watershed included on the MPCA impaired waters 303(d) list be improved so that these waterbodies can be removed from that list.

Policy 2.5: Use of existing natural retention and detention areas for stormwater management to maintain or improve existing water quality will be achieved to the extent possible.

Policy 2.6: The City supports land use planning, policies and controls that maintain sustainable, high-quality surface water resources and ensure that development causes no adverse or cumulative impacts.

Policy 2.7: Adopt policies to appropriately apply the least amount of chlorides necessary for winter road maintenance to provide safe driving conditions.

Goal 3: Erosion Control

The purpose of this goal is to minimize soil erosion through increased education and enforcement, in accordance with the MCWD and NMCWD. Water quality problems are frequently linked to high phosphorus concentrations. Phosphorus is often transported to surface water through soil erosion but can also be transported to waters in a variety of other mechanisms. Nevertheless, erosion control is an important factor in the effort to improve surface water quality. Soil erosion and sediment deposition can also impact pond and drainage-way performance and create maintenance issues.

Ponds and drainage facilities may be impacted by erosion and sedimentation from a variety of sources including construction sites and winter street sanding. The coarse sediment accumulates in ditches and ponds where runoff velocities are low. When a sand delta appears at a storm sewer outfall that is a visible indication of the effectiveness of erosion and sediment control measures and road maintenance activities of the past winter. As the sediment builds up over time, it reduces the capacity of the drainage system and the pollutant removal capabilities of ponds by reducing storage volume below the outlet. This also reduces the infiltration rates for stormwater facilities.

Extending the life of facilities involves source control and elimination of the material that causes the problem. Regulatory actions will control a major portion of the sediment. Street maintenance and an effective sweeping program will also have a positive impact on sediment accumulation.

Subject: Erosion control.

Purpose: To control erosion and sedimentation.

Goal: Minimize soil erosion through increased education, enforcement and management of stormwater.

Erosion Control Policies

Policy 3.1: Erosion and Sedimentation Control Plans shall be reviewed and enforced by the City for all grading activities. These plans shall conform to the general criteria set forth by the City's policies and applicable NPDES /SDS Permit (MPCA Permit MN R100001) requirements.

Policy 3.2: The City will implement its erosion control ordinance to control erosion and sediment to extend the effective life of water resource facilities and reduce pollutant loading to streams, lakes, and wetlands.

Policy 3.3: The City will develop proactive measures such as education, and recognition of erosion control efforts to prevent soil erosion and encourage responsible site development.

Policy 3.4: Construction site inspection by the City must be completed prior to commencing earthwork activities to ensure the proper BMPs are in place and operational.

Policy 3.5: Best management practices shall be used at all construction sites per the MPCA's MS4 general permit to discharge stormwater associated with construction activities.

Policy 3.6: The City will maximize the use of bioengineering approaches whenever possible for all slope stabilization and permanent erosion control projects.

Goal 4: Wetlands

The purpose of this goal is to maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City, in accordance with the MCWD and NMCWD rules. The watershed districts are the LGU for the Wetland Conservation Act (WCA). The City has not completed a Comprehensive Wetland Management Plan. The wetland inventory is based on the wetlands on the National Wetland Inventory (NWI), Minnesota Department of Natural Resources (MNDNR) and MCWD records, which may not include all of the wetlands and aquatic resources in the City. Field delineation, assessment of hydrology, identification of plant species, characterizations of soils, MnRAM assessment and restoration are generally completed and reviewed on an “as development occurs” basis. This approach places the financial burden for identification, delineation, and possible restoration on the land developer.

The policies below will be used to achieve the City’s wetland goals. The strategies will apply to new development and redevelopment projects submitted to the City for review and approval. Any wetland habitat on property to be developed will be subject to the following management strategies, as well as the rules and requirements of the WCA and other City, State, and Federal regulations.

Proper implementation of wetland buffers during developments is paramount. Without proper implementation of buffers; creek and wetland water temperatures increase, sediment deposition increases, stream bank erosion and collapse are more severe, and riparian habitats are destroyed.

Subject: Wetland Management

Purpose: To utilize, protect, preserve, and enhance existing natural wetlands.

Goal: Maintain or increase the amount of wetland acreage, and increase the wetland functions and values within the City.

Wetland Policies

Policy 4.1: The MCWD and NMCWD shall administer wetland protection and mitigation as the LGU in accordance with the Minnesota WCA.

Policy 4.2: Pretreatment of runoff shall be provided for runoff directly discharged into a wetland.

Policy 4.3: The City may utilize the available technical resources of outside agencies, such as the Minnesota DNR, USACE, Scott SWCD, the Board of Water and Soil Resources and/or the MCWD and NMCWD, for review of private developments and City-proposed projects that may affect wetland resources.

Policy 4.4: A protective buffer strip of natural vegetation must be retained around wetlands in accordance with the standards in the City’s Engineering Design Guidelines.

Policy 4.5: Where feasible, the duration and magnitude of water level fluctuation in wetlands from stormwater runoff shall be minimized to prevent adverse habitat changes.

Policy 4.6: Replacement for unavoidable wetland impacts will be provided (if possible, within the same subwatershed), in accordance with the requirements of the MCWD, the NMCWD and the WCA.

Goal 5: Groundwater Management

The City’s groundwater resources are identified in the City’s Wellhead Protection Plan. The City’s

aquifers have been assigned a “Vulnerable” rating. This rating indicates “there is a hydraulic connection between surface waters and the aquifer serving the water supply system for the City”.

The City of Hopkins Wellhead Protection Plan currently outlines requirements for continued groundwater protection and well management. The report is obtainable from the City.

Subject: Groundwater Management

Purpose: To protect groundwater quality and improve groundwater supplies through effective management.

Goal: Provide clean and safe drinking water for the City while managing increased development and population.

Groundwater Management Policies

Policy 5.1: Promote ongoing evaluation of land use impacts on groundwater quality and quantity.

Policy 5.2: Provide information to the public by revising and updating the City Wellhead Protection Plan as required by the Minnesota Department of Health.

Policy 5.3: Support identification and reduction of groundwater contamination from both point and non-point sources.

Policy 5.4: Promote water conservation efforts to reduce water use and conserve the City’s groundwater resources.

Policy 5.5: Infiltration of stormwater and resulting groundwater recharge will be promoted where feasible and if it does not pose a threat to groundwater quality.

Policy 5.6: The City will continue to implement its Wellhead Protection Plan.

Goal 6: Floodplain Management

The Minnehaha Creek and Nine Mile Creek corridors are shown on the Flood Insurance Rate Map (FIRM) for the City of Hopkins that are identified as Zone AE floodplains (see **Figure SW-01**). Base flood elevations have been determined for these floodplains. The City’s ordinance will regulate development adjacent to the floodplain districts.

Moderate flood hazard areas, labeled Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood (100-year) and the 0.2-percent-annual-chance (or 500-year) flood. Unshaded Zone X areas are those areas determined to be outside the 100-year and 500-year floodplains.

These areas have been identified on the FIRM as areas of moderate or minimal hazard from the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems.

Subject: Floodplain Management

Purpose: To provide flood protection for people and property.

Goal: Manage and protect the floodplains from encroachment.

Floodplain Management Policies

Policy 6.1: Protect the natural function of a floodwater storage area in a floodplain from encroachment.

Policy 6.2: Work to maintain no net loss of floodplain storage.

Policy 6.3: Manage floodplains to maintain critical 100-year flood storage volumes.

Policy 6.4: Restrict construction of new structures to sites above flood prone areas.

Policy 6.5: Maximize upstream floodwater storage areas and require mitigation for any fill within a floodplain.

Goal 7: Public Participation, Information & Education

The purpose of this goal is to increase public participation and knowledge in management of the City's water resources, in accordance with the MWCD and the NMCWD. Public involvement is a strategy that recognizes people want to be involved in decisions that affect any facet of their life. It provides opportunities for the public to participate in the processes that lead to decision-making.

As part of the NPDES/SDS Phase II requirements the City was required to prepare a Surface Water Pollution Prevention Plan (SWPPP). There are two minimum control measures in the SWPPP that deal with public education and participation. Measure number one is: Public Education and Outreach on Storm Water Impacts. Measure number two is: Public Participation and Involvement. To meet the permit requirements the City must educate its citizens on six minimum control measures in the SWPPP. The City must also hold at least one public meeting per year to address the annual report regarding the SWPPP to receive public input. The activities described in the SWPPP will be the guiding document that will be followed to increase public awareness of the storm water related issues.

The website is an alternative medium to provide municipal information to both City residents and those people who live outside of Hopkins. The following is a link to the City's storm water management website:

<http://www.hopkinsmn.com/446/Storm-Water-Management>

The City will continue to distribute information on pertinent stormwater management issues via the City weekly newsletter "Connections". The newsletter will periodically promote opportunities for residents to participate in water resources management activities. The City will make an ongoing effort on both a City-wide and watershed level toward educating the public by distributing information to its residents on responsible practices they should employ to protect water resources within the community.

Subject: Enhancement of Public Participation, Information and Education

Purpose: Encourage active community involvement in water resources management.

Goal: Increase public participation and knowledge in management of the water resources of the community.

Public Involvement Policies

Policy 7.1: The City will use a public involvement process in resource management decision-making

(i.e., the Park Board and the Planning and Zoning Commission).

Policy 7.2: The City will use a variety of media, including newsletters, and the City's Website, to inform the community about water resource issue programs including illicit discharges, storm water grants, fertilizers, etc.

Policy 7.3: The City will work with all available resources to increase public participation in water resources management.

Policy 7.4: The City will follow the best management practices outlined in the City's Storm Water Pollution Prevention Plan (SWPPP) that address public education and outreach and public participation/involvement. Educational goals and activities have been identified in the SWPPP to make the public more informed of the impact storm water discharges and pollutants have on receiving waters.

Assessment of Problems

An assessment was done of the water resource problems in Hopkins. These problems include both existing problems and potential problems. The existing problems are issues that currently exist in Hopkins from past natural events, development, or pollution. The potential problems are issues that may happen if actions are not taken to improve current issues or prevent new issues from arising. These problems are summarized below:

1. Surface Water Quantity

Any new construction has the potential of increasing runoff rates and volumes. The City should review stormwater concerns in its construction permitting process, as part of its MS4 program. The detail of each review can be related to the potential the project has to affect downstream areas.

Several types of modifications can affect the existing runoff conditions. Below is a list of some activities which could significantly affect flooding. Proposed construction which meets any of these conditions should be subject to a more detailed runoff analysis before it is approved:

- a. The construction increases the amount of impervious area.
- b. The construction changes any stormwater flow path (on surface or sewer).
- c. The construction is within a local low area.
- d. The construction reduces existing stormwater detention in any local low area.
- e. The construction includes a land area of more than a few acres.

Climate change is increasing the intensity and frequency of storm events. Sizing of ponds and conveyance systems to current standards is critical to prevent the worsening of downstream flooding. Also, protecting existing surface overflow locations and elevations during development is vital.

2. Water Quality in the Local Creeks, Lakes and Other Bodies of Water

Water quality can be affected by runoff, animals, and climate change, as well as a wide variety of other sources. One of the main designations of poor water quality in a body of water is if it is considered an impaired water. It will be a goal of the City to preserve the current quality of their water resources as well as improve them where applicable. The Environmental Protection Agency (EPA) requires that the Minnesota Pollution Control Agency (MPCA) have standards to assess the

quality of Minnesota waters under the federal Clean Water Act (CWA). The MPCA declares that any body of water that does not meet one or more of the quality pollution control standards is considered to be an impaired body of water. The MPCA is responsible for protecting the bodies of water in Minnesota from pollutants and restoring impaired waters to a higher quality of water to preserve their beneficial uses. Under Section 303(d) of the CWA, states have to identify their impaired waters and submit a list every two years. Along with a published list of the impaired waters for the state, a Total Maximum Daily Load (TMDL) Study is also required for approval by the EPA.

Surface waters are assessed for several beneficial uses. The uses include aquatic life, drinking water and aquatic consumption (human health-based), aquatic consumption (wildlife-based), aquatic recreation, and limited value resource waters. The pollutants for each of these uses ranges widely. The pollutants assessed are low dissolved oxygen, pH, total suspended solids (TSS), temperature, trace metals, and bacteria, along with many others. The impaired waters in Hopkins and information about each can be found in Table 1.0. An illustration of the locations of existing impaired waters in Hopkins is shown in **Figure SW-01**.

Impaired Waters

Total Maximum Daily Load (TMDL) represents the maximum amount of a pollutant that a water body can receive and still meet federal and state water quality standards. TMDL also refers to the process of allocating pollutant loadings among point and non-point sources.

Minnehaha Creek, from Porter Creek to the Minnesota River, was initially added to the list of 303d impaired waters in 2004. It is currently listed for impairments due to aquatic macroinvertebrate bio assessments, fishes bioassessments, and dissolved oxygen.

Nine Mile Creek, from the headwaters to Metro Boulevard, was initially added to the list of 303d impaired waters in 2004 for fishes bioassessments as a stressor/pollutant.

In the 2018 draft 303d impaired waters list the stressor/pollutant for aquatic macroinvertebrate bioassessments has been added. In 2002 Nine Mile creek was listed as impaired for turbidity from the headwaters to the Minnesota River, but has been delisted for this pollutant in 2010.

Minnehaha Creek and Nine Mile Creek are identified in the 2018 draft list of impaired waters for the following impairments:

Table WR-4: Impaired Waters List					
Waterbody	Affected Designated Use	Pollutant or Stressor	Year Listed	TMDL Study Target Completion	TMDL Study Approved
Nine Mile Creek	Aquatic Life	Chloride	2004	---	2010
	Aquatic Life	Fish Bioassessments	2004	2019	---
Minnehaha Creek	Aquatic Recreation	E. coli	2008	---	2014
	Aquatic Life	Chloride	2008	---	2016
	Aquatic Life	Fishes Bioassessments	2004	2025	---

Table WR-4: Impaired Waters List					
	Aquatic Life	Aquatic Intervertebrate Bioassessments	2014	2025	---
	Aquatic Life	Dissolved Oxygen	2010	2025	---

The City looks forward to working with the MPCA, Minnehaha Creek and the Nine Mile Creek Watershed Districts in the TMDL study planning process.

3. Erosion Control

Erosion Control is an area that the City has put forth considerable effort. With the adoption of the Erosion Control Ordinance in October 2008, the City has the regulatory mechanism in place to promote and enforce actions that reduce soil erosion and sedimentation.

4. Wetlands

The City's wetlands, in general, are affected by stormwater runoff discharged into the wetlands. The City recognizes the benefits of healthy wetlands and when projects are proposed in the vicinity of wetlands actions will be taken to treat water prior to discharge into existing wetlands.

5. Groundwater Management

The majority of the City is located within a Drinking Water Surface Management Area (DWSMA) which necessitates increased land use controls to protect groundwater-based drinking supplies from contamination. Potential sources of contaminants within 200 feet of the system's water sources are identified in the City's Wellhead Protection Plan.

While the City normally promotes infiltration as a stormwater best management practice, it may not be appropriate on all sites. The City's management of stormwater with regards to its impact on groundwater is guided by the City's Stormwater Pollution Prevention Plan, MS4 permit and ordinances.

6. Floodplain Management

The City will need to continue to address localized flooding areas to protect life and property and reduce the burden of maintaining the storm sewer system. The City requires all stormwater infrastructure, development and redevelopment projects to use updated Atlas 14 rainfall frequency data in their analysis and design process to account for the latest weather trends. Evaluating the existing drainage system as part of the annual street improvement program will be an essential element of the City's efforts to manage and reduce localized flooding.

7. Public Education

Continued public education regarding storm water related issues for residents, developers and City staff.

Implementation Program and Associated Costs

The overall implementation program includes a mixture of capital improvement projects, studies, ongoing maintenance, inspection, and other recommended management activities over the next 10 years. As with all improvements, there is a cost associated with prudent storm water management. The Stormwater Utility Fund (SUF) is used for expenses associated with maintaining and improving the City's stormwater

system. It is anticipated that projects will be paid for using the SUF, the general fund and grants that may be obtained for special projects.

The City of Hopkins is a MS4 (Municipal Separated Storm Sewer System) community and is subject to those rules of the Minnesota Pollution Control Agency (MPCA). In order to accomplish the water resource goals created by this plan and in the MS4 SWPPP, the City will work with local and statewide agencies.

- The City will seek opportunities to incorporate runoff control, infiltration, and other best management practices into infrastructure and redevelopment projects as a means to improve stormwater management within a highly developed city.
- Use development review and approval process to ensure that minimum standards are met and explore achievement of higher standards through BMPs to achieve water resource goals.
- Work closely with MCWD and NMCWD for future TMDL studies affecting Minnehaha Creek and Nine Mile Creek.

Financial Considerations

The cost of implementing the Water Resource Management Plan will be supported by several revenue sources. Table 7.0 includes several of the sources that will be used to implement the plan.

Table WR-5: Water Resource Management Plan Funding	
Potential Funding Source	Revenue Produced
<ul style="list-style-type: none"> • <u>City’s Storm Sewer Utility Fee</u> The City has implemented a storm sewer fee that charges home owners \$5.00/month. The funds generated from this fee are used to finance the storm water management program. Commercial and multi-family residential property is charged on a per acre basis. 	Approximately \$810,000/year.
<ul style="list-style-type: none"> • <u>Special Assessments</u> The idea behind this assessment method is that generally the benefited properties pay in relation to the benefits received. The benefit would be realized by an increase in market value of the property that resulted from the improvement. 	Variable depending on the projects undertaken.
<ul style="list-style-type: none"> • <u>Grants</u> State and Federal grants are available for surface water management and non-point source pollution. Grants can be a good way to help fund special projects that meet grant eligibility criteria, but are not a good finance source to depend upon for an annual income source. 	Variable depending on the projects undertaken.
<ul style="list-style-type: none"> • <u>Land Development Fees</u> As new development occurs, each building permit requires a total valuation fee per building. 	Variable depending upon the amount of development that occurs on an annual basis.

Table 7.1 is an implementation table of the recommended projects, timing, cost and funding sources that are applicable in order to achieve the plan goals. The City will finance these goals either directly or by specific development related review and construction inspection budgets.

Table WR-6: Proposed Implementation Program

Project Description	Timing	Estimated Cost	Funding Source
Storm sewer reconstruction	Annual	\$200,000	SUF
Storm sewer maintenance program to ensure the successful operation of the drainage system.	On-going	\$15,000	SUF
Enforcement of the erosion and sedimentation control ordinance for new developments.	On-going, as development projects are submitted to the City for approval		Funding by developer's fees, building permits and fines collected for non-compliance.
High water elevations governing building finish floor elevations adjacent to ponding areas and floodplains to be established per this Plan, Rules, and Ordinance.	On-going, as development projects are submitted to the City for approval		Funding by developer's fees and building permits.
Inspect stormwater ponds (100% per permit cycle).	On-going	\$2,000	SUF
Storm sewer pond maintenance & clean out.	On-going	\$25,000	SUF
Inspect 20% of all outfalls 24" and larger.	On-going	\$1,000	SUF
Inspect erosion control BMP's on all construction sites.	On-going	\$10,000	Funding by developer's fees & building permits.
Street sweeping at 2 times per year.	On-going	\$25,000	SMF
Continue active participation in the activities of the watershed districts located within the city.	On-going		SUF
Implement education program on stormwater education for City residents, staff and development community.	On-going	\$2,500	SUF
Implement illicit discharge education, detection, and elimination tasks included in SWPPP.	On-going	\$3,000	SUF
Maintain city website with stormwater management issues.	On-going		SUF
Revise City ordinances as necessary to stay compliant with the latest NPDES and MS4 permits.	Every 5 years	\$5,000	SUF
Continued implementation of the City's Wellhead Protection Program	On-going	\$2,000	SUF
Update storm sewer system mapping in the City's GIS and other databases.	On-going	\$5,000	SUF
Stormwater plan review for new development projects.	On-going	Varies	Development fees
Review stormwater utility fee for sufficient operating funds.	Every 5 years	\$5,000	SUF

GF = General Fund, SUF = Stormwater Utility Fund

Note: Cost estimates are based upon present day dollar amounts, and do not account for inflation.